

Claims

- [c1] A ball valve comprising:
- a body having a passageway extending there through;
 - a ball member disposed in said passageway and mounted for selective rotation between valve open and valve closed positions to control fluid flow through the valve;
 - a pair of flange grooves in said body on opposite sides of said ball, each said flange groove extending radially from said passageway;
 - a pair of seat rings in said passageway on opposite sides of said ball;
 - each seat ring having a first sealing surface in contact with an outer surface of said ball;
 - each seat ring having a radially extending annular flange received in an associated one of said flange grooves; and
 - a pair of annular flange seals each disposed in a respective one of said flange grooves.
- [c2] The valve of claim 1 wherein said flange seal comprises an elastomeric material.
- [c3] The valve of claim 1 wherein said flange seal comprises an o-ring.

- [c4] The valve of claim 1 wherein said flange seal comprises an energized resilient seal with spring-like characteristics.
- [c5] The valve of claim 1 wherein said seat rings comprise a relatively harder and stiffer thermoplastic material compared to PTFE.
- [c6] The valve of claim 5 wherein said seat rings comprise PEEK.
- [c7] The valve of claim 1 wherein each said flange and flange seal is axially compressed in said flange groove.
- [c8] The valve of claim 7 wherein each said flange is axially compressed to form a seal between said flange and said body.
- [c9] The valve of claim 7 wherein each said flange is radially tapered so that under axial compression said flange forms a primary seal at a corner in said flange groove.
- [c10] The valve of claim 9 wherein each said flange seal provides a secondary seal relative to said primary seal.
- [c11] The valve of claim 10 wherein each said flange seal forms axial seals against said flange and said valve body.
- [c12] The valve of claim 1 wherein said seat ring flanges are

axially compressed in said flange grooves and limit axial movement of said seat rings when the valve is under pressure.

- [c13] The valve of claim 12 wherein each said flange seal is disposed in a recess of a respective flange and separated from said passageway by said seat ring flange, said flange seal being stationary independent of said axial movement of said seat rings.
- [c14] The valve of claim 13 wherein each said seat ring flange comprises a circumferential recess, said respective flange seal being disposed in said flange recess.
- [c15] The valve of claim 14 wherein said circumferential flange recess is formed along an outer perimeter of said flange; and wherein said flange seal has an axial dimension greater than an axial dimension of said recess so that said flange seal is axially compressed when the valve is assembled to apply an energized load against said seat ring flange.
- [c16] The valve of claim 1 wherein each said seat flange seal comprises flexible graphite.
- [c17] In a ball valve of the type comprising a rotatable ball member disposed in a fluid passageway of a valve body and a pair of seat rings each having a central main body

that is respectively compressed against opposite sides of the ball member, the improvement comprising:
each seat ring comprising a flange that extends radially from said main body; and a flange seal comprising a resilient material that is axially compressed with said flange to form an energized body seal.

[c18] The valve of claim 17 further comprising a resilient force applying member that applies an axial load against said flange to form a second energized body seal.

[c19] The valve of claim 18 wherein each flange is bent around a corner of said valve body to form a high compression inner body seal.

[c20] The valve of claim 19 wherein said flange seal provides an outer body seal.